Flare 8 Root Cause And Corrective Action Analysis Report – NSPS Ja

February 20, 2021 through February 21, 2021

In accordance with Title 40, Part 60, Subpart Ja, provided below is information related to the discharge to the No. 8 Flare in excess of 500 lbs in a 24-hour period in accordance with §60.103a(c) and the recordkeeping and reporting requirements of 40 C.F.R. §60.108a(c)(6). This report also includes information required under the Consent Decree entered in United States, et al. v. HOVENSA, LLC, Civ. No. 1:11-cv-0006.

a. A description of the discharge [40 CFR §60.108a(c)(6)(i)]

The following is a description of the discharge event that resulted in SO_2 exceedances for the following time periods:

- *February 20, 2021 at 22:00 through February 21, 2021 at 07:00*
- *February 21, 2021 at 10:00 through February 21, 2021 at 20:00*

The concentration of H_2S (~30 ppm) and SO_2 (~20 ppm) in the flare gas were relatively low throughout the entire incident, which suggested that the increase in SO_2 emissions may have been caused by an increase in flare gas flow. An evaluation of flare gas flow data for the 24-hour period prior to the event confirms that average gas flow was approximately 5% higher during the event. However, the data also suggest that flare gas flow leading up this event and immediately following this event may have been higher than normal resulting in SO_2 hourly mass emissions that were slightly lower than the SO_2 emission limit (500 pph). While the data suggests an increase in flare gas flow, it also suggests that the source of the additional gas must have had relatively low concentrations of H_2S, as there was no corresponding spike in flare H_2S concentrations.

b. The date and time the discharge was first identified and the duration of the discharge [40 CFR §60.108a(c)(6)(ii)] & [Consent Decree Paragraph 60.a]

The discharge was first identified on February 20, 2021 at 22:00. The duration of the resulting SO_2 excess emissions event was approximately 19 hours.

c. The measured or calculated cumulative quantity of gas discharged over the discharge duration. Include measured H_2S, Total sulfur, SO_2, and flow rate as applicable. [40 CFR §60.108a(c)(6)(iii)-(vii)] and calculations used to determine the quantity of SO_2 that was emitted. [Consent Decree Paragraph 60.b]

Appendix 1 to this document includes the data recorded by the data acquisition and handling system related to the continuous monitoring system located at Flare 8. SO_2 emissions are calculated using the total reduced sulfur quantity measured by analyzer in the flare header, the total flow to the flare, and a 99% conversion of total sulfur to SO_2 per 40 CFR §60.108a(c)(6)(vii.)

d. The steps taken to limit the emissions during the discharge and the duration of the discharge. [40 CFR §60.108a(c)(6)(viii)] and [Consent Decree Paragraph 60.c]

Operations surveyed the refinery to identify the source(s) of gases to the flare. The duration of the event was approximately 19 hours as described in "b" and "c" above.

e. The root cause analysis and corrective action analysis including an identification of the affected facility, the date and duration of the discharge, a statement noting whether the discharge resulted from the same root cause(s) identified in a previous analysis and either a description of the recommended corrective action(s) or an explanation of why corrective action is not necessary. [40 CFR §60.108a(c)(6)(ix)] and [Consent Decree Paragraph 60.d]

1. *The rapid depressurization of 6DD during shutdown may be the primary contributor to increased flare gas flow during the flaring event.*
2. *A secondary contributor includes the venting of LP gases to flare due to GRU compressor shutdown.*
3. *The release occurred from Flare 8, an affected facility under NSPS, Subpart Ja.*
4. *The duration of the event was 19 hours as described in "b" and "c" above.*
5. *This discharge did not result from a similar root cause identified in the following previous analysis:*
6. *The root cause analysis:*

Root Cause Analysis	*Corrective Action Analysis (or explanation that no corrective is necessary)*	*Status: completed within 45 days or schedule with proposed implementation and completion dates*
Rapid depressurization of 6DD during shut-down	*Modify current 6DD operational shutdown procedure and establish a maximum rate of depressurization for instances of non-emergency shutdowns*	*In progress Estimated Completion Date: July 30, 2021*
Venting of LP gases to flare due to GRU compressor shutdown	*No corrective action necessary, procedures were followed*	

f. An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of the discharge resulting from the same root cause or significant contributing causes in the future. The analysis shall discuss all reasonable alternatives, if any, that are available, the probable effectiveness and cost of the alternatives, and whether an outside consultant should be retained to assist in the analysis. Possible design, operation and maintenance changes shall be evaluated. [Consent Decree Paragraph 60.e]

The following corrective measures to reduce the likelihood of a recurrence will be completed by July 30, 2021:

- *Modify current 6DD operational shutdown procedure and establish a maximum rate of depressurization for instances of non-emergency shutdowns*

g. For Acid Gas Flaring Incidents (not Hydrocarbon Flaring Incidents), specifically identify each of the grounds for stipulated penalties in paragraphs 63, 64 and 65 and describe whether the Incident falls under any of those grounds. [Consent Decree Paragraph 60.f]

There is no evidence that acid gas went to the flare during this event.

h. For any corrective action analysis for which corrective actions are required, a description of the corrective action(s) completed within the first 45 days following the discharge and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates. [40 CFR §60.108a(c)(6)(x)] and [Consent Decree Paragraph 60.h for supplement report]

See response to "e" above.

i. If the analysis determines that corrective action is not required, the report shall explain the basis for that conclusion. [Consent Decree Paragraph 60.e]

See response to "e" above.

j. For each discharge from a flare that is the result of a planned startup or shutdown of a refinery process unit or ancillary equipment connected to the flare, a statement that a root cause analysis and corrective action analysis are not necessary because the owner or operator followed the flare management plan. [40 CFR §60.108a(c)(6)(xi)]

Not applicable.

Appendix 1 – DAHS Records

Flare 8 Report

Plant: LIMETREE BAY REFINERY

Report Period: 02/20/2021 22:00 Through 02/21/2021 20:

Source		FLARE08						
Parameter (Unit)		H2SPPMD (PPM) 001H	H2SPPMD (PPM) 003H	SO2LBS (LBS) 001H	SO2LBS (LBS) 024H	SO2CDLBS (LBS) 001H	VG_FLOWT (SCF) 001H	VG_FLOWT (SCF) 024H
			162		500			1000000
02/20/21	22:00	32.4	54.4	19.8	502.3 E	0.0	671,620.8 *	15,351,755.0 E
02/20/21	23:00	36.3	34.8	20.2	508.8 E	0.0	662,495.3	15,600,257.5 E
02/21/21	00:00	34.4	34.4	20.0	511.0 E	0.0	667,954.1	15,784,683.8 E
02/21/21	01:00	42.1	37.6	21.0	512.7 E	0.0	671,286.4	15,857,367.1 E
02/21/21	02:00	38.4	38.3	20.9	513.9 E	0.0	671,167.1	15,805,681.2 E
02/21/21	03:00	31.1	37.2	20.1	509.8 E	0.0	663,764.7	15,702,607.4 E
02/21/21	04:00	30.7	33.4	19.8	505.6 E	0.0	658,100.8 *	15,616,781.1 E
02/21/21	05:00	31.1 C	31.0	19.9	504.4 E	0.0	657,458.7	15,572,378.1 E
02/21/21	06:00	31.4 C	31.1	19.6	501.7 E	0.0	654,489.4	15,527,681.5 E
02/21/21	07:00	30.5	31.0	19.8	499.4	0.0	650,236.8	15,480,277.6 E
02/21/21	08:00	31.6	31.2	21.0	498.8	0.0	651,836.9	15,484,540.1 E
02/21/21	09:00	30.7	30.9	21.7	500.0	0.0	645,278.0	15,511,623.9 E
02/21/21	10:00	31.6	31.3	21.8	501.5 E	0.0	644,764.0	15,524,307.8 E
02/21/21	11:00	29.6	30.6	21.8	501.5 E	0.0	650,367.2	15,555,673.6 E
02/21/21	12:00	29.0	30.1	21.8	501.7 E	0.0	652,541.7 *	15,592,235.5 E
02/21/21	13:00	29.5	29.4	22.0	502.3 E	0.0	650,141.6 *	15,618,656.9 E
02/21/21	14:00	37.1	31.9	21.6	502.7 E	0.0	603,209.0 *	15,587,498.7 E
02/21/21	15:00	33.6	33.4	20.1	502.7 E	0.0	595,125.2	15,556,377.3 E
02/21/21	16:00	27.7	32.8	20.4	502.7 E	0.0	643,062.8	15,562,811.5 E
02/21/21	17:00	25.5	28.9	20.4	502.6 E	0.0	664,425.8	15,585,956.5 E
02/21/21	18:00	22.9	25.4	21.1	503.8 E	0.0	693,341.6	15,650,027.4 E
02/21/21	19:00	21.9	23.5	21.0	500.3 E	0.0	692,373.7	15,716,519.0 E

F = Unit Offline E = Exceedance C = Calibration S = Substituted U - Startup

I = Invalid M = Maintenance T = Out Of Control * = Suspect D - Shutdown